215 Awardee Talk: Astaxanthin Supplementation During Deconditioning and Reconditioning Periods Reduces Oxidative Stress in Circulation in Polo Ponies. Mia Y. Kawaida[1], Oh Sung Kwon[1], Ahram Ahn[1], Amanda S. Reiter[1], Nicole M. Tillquist[1], Sarah A. Reed[1], [1]*University of Connecticut*

Abstract: Oxidative status is impacted by fitness and dietary nutrients, such as antioxidants. We hypothesized that astaxanthin (ASTX) supplementation would improve oxidative status in the circulation and muscle in response to exercise following deconditioning and reconditioning in horses. Twelve conditioned polo ponies (14.8 ± 1.7 yr) were assigned to control (CON; n = 6) or astaxanthin supplemented (ASTX; n = 6; 75 mg ASTX daily) groups. Horses performed 26 min submaximal exercise tests (SET) followed by 30 min of recovery while in condition (SET1), after 16 wk of deconditioning (SET2), and after 16 wk of reconditioning (SET3). Blood samples were collected 30 min before and 0, 15, 30, and 60 min after each SET. Semitendinosus muscle biopsies were collected 2 wk before and 2 hr after each SET. Using commercially available kits, plasma and muscle superoxide dismutase (SOD) and glutathione peroxidase (GPX) activities and plasma malondialdehyde (MDA) concentrations were determined. At SET2, ASTX had 116% greater plasma SOD activities than CON (P=0.001). Both treatment groups increased from SET2 to SET3 (P< 0.001), but there were no treatment effects at SET3 (P=0.788). At SET2, plasma GPX activities were 49.3% greater in ASTX than CON (P=0.012), and ASTX tended to be 21.2% greater than CON at SET3 (P=0.096). Plasma MDA concentrations were 22.2% greater in CON than ASTX at SET2 (P=0.034), but not at SET1 or SET3 (P≥0.449). There were no detectable differences in muscle SOD or GPX activities 2 wk before or 2 hr after any SET (P≥0.309). In conclusion, ASTX supplementation maintained circulating antioxidant capacity and minimized oxidant activities during deconditioning, reducing oxidative stress in response to the SET in the circulation but not in the skeletal muscle. This may enable horses to adjust to strenuous exercise more efficiently, improving athletic performance, especially when they are re-introduced to exercise after deconditioning.

Keywords: deconditioning, oxidative stress, reconditioning

219 Evaluation of Dietary Arginine Supplementation to Increase Placental Nutrient Transporters of Aged Mares. Rafael E. Martinez[1], Jessica L. Leatherwood[1], Amanda N. Bradbery[2], Brittany L. Silvers[1], Carolyn J. Hammer[3], Dale Kelley[4], Fuller W. Bazer[1], Guoyao Wu[5], [1]*Department of Animal Science, Texas A&M University and Texas A&M AgriLife Research,* [2]*Department of Animal and Range Sciences, Montana State University,* [3]*Department of Animal Sciences, North Dakota State University,* [4]*College of Veterinary Medicine, Oklahoma State University,* [5]*Texas A&M University*

Abstract: Nine pregnant mares (18.2 ± 0.7 y; 493.82 ± 13 kg BW) were used to test the hypothesis that dietary supplementation of arginine would enhance placental vascularity and nutrient transport throughout gestation in aged mares. Mares were balanced by age, BW, and stallion pairing, and randomly assigned to one of two dietary treatments consisting of supplemental L-arginine (50 mg/kg BW; n=5) or L-alanine (100 mg/kg BW; n=4; isonitrogenous control). Mares were individually fed concentrate top-dressed with the respective amino acid treatment plus ad libitum access to Coastal bermudagrass hay. Treatments began on d 14 of gestation and were terminated at parturition. Mare BW, BCS, and rump fat were determined every 28 d and concentrate adjusted accordingly. Parturition was attended with foaling variables and placental measures recorded. Placental tissue from the pregnant horn underwent histological analyses to assess cell-specific localization of vascular endothelial growth factor (VEGF) and cationic amino acid transporter 1 (CAT1) proteins. Semiquantitative analyses were performed using 10 non-overlapping images per sample fixed in a 10X field (Fiji ImageJ v1.2). Data were analyzed using SAS PROC MIXED procedure. BW increased (P < 0.01) in all mares with advancing gestation. BW, BCS, and gestation length of mares were not influenced (P > 0.05) by supplemental arginine. Compared with arginine-supplemented mares, control mares had a thicker rump fat layer (P < 0.01) at parturition. Body length, height, and BW of foals at birth, as well as placental weight, volume, and positive staining for VEGF and CAT1 at parturition were not affected (P > 0.05) by maternal arginine supplementation. These results indicate dietary arginine supplementation (50 mg/kg BW) is safe for gestating mares and promotes mobilization of white adipose tissue. A larger number of mares is required to determine effects of supplemental arginine on embryonic/fetal survival and growth in mares.

Keywords: L-arginine, mare, placenta